ATOMIC ENERGY Letter

THE FIRST AND ONLY

ROBERT M. SHERMAN, EDITOR. PUBLISHED BI-WEEKLY BY ATOMIC ENERGY NEWS CO., 1000 SIXTH AVENUE, NEW YORK 18, N. Y.

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Dear Sir:

With the issuance last week of U. S. Patent No. 2,681,883, a method of recovering heavy water (deuterium oxide) from a solution of heavy water and uranyl fluoride has now been publicly revealed. While the original application had been made in January, 1946, it was not until January, 1954, that the process was declassified; consequently all papers had been held up in the Patent Office until recently. Work was done under the Manhattan District, predecessor to the USAEC; assignment of patent is to the USAEC. (Other PATENT news, page 5 this LETTER.)

The Merrill Company, a metallurgy and engineering firm (San Francisco) which is currently engaged in classified research for the USAEC, has now sold its research and development division and laboratories to Arthur D. Little, Inc., Cambridge. The Merrill laboratories will now be known as the Western Laboratories Division of Arthur D. Little, Inc. Charles G. Harford, of ADL, will head the Western Laboratories Division. (Other BUSINESS news, page 2 this LETTER.)

A low-cost, light weight isolation hood, or dry box, of clear plastic material, which is said to be chemically inert and capable of withstanding heat up to 450 deg. F., is now available as a stock item from P. M. Lennard Co., Inc., 671 Bergen St., Brooklyn 38, N.Y. The standard and optional equipment available includes air filtration, refrigeration, airlock compartments, glove port facilities, etc. A newly designed and patented humidistat sensitive to changes in relative humidity as low as 2%, has also been incorporated into the unit.....A new respirator, said to be effective against airborne radioactive matter, dust, fumes and mist, is available from the American Optical Co. Called the Super Micro-Toxisol Respirator, it provides an effective filtering area of 45 sq. in. in each of two filters.....A trend toward the use of radiation devices in industry has now been reported by the Wall Street Journal which found that in 15 years the number of plants in the U.S. using X-ray equipment has increased from less than 500 to more than 4000.....(Other PRODUCT, PROCESS & EQUIPMENT news, page 3 this LETTER.)

A radiological health training program, sponsored by the U.S. Public Health Service for the training of public health workers, will include a series of courses starting this coming November, and running until May, 1955. The courses will cover: Problems of Radioactivity in Waterworks; Basic Course in Radiological Health; Occupational Radiation Protection; Radiation Hygiene-Preventive Medical Aspects; and Environmental Radiation Sanitation. Further information may be obtained from Radiological Health Training Section, USPHS, 4676 Columbia Parkway, Cincinnati 26, Ohio.....A Symposium on the Applications of Radioactivity in the Rubber and Plastics Industries is now to be held in Boston, October 6-8, 1954, under the sponsorship of Tracerlab, Inc., Boston nuclear device manufacturer. Aim of the Symposium will be to acquaint members of the plastics and rubber industries with uses and applications of radioisotopes in research, development, and process control.

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BUSINESS NEWS...in the nuclear field...

ADVANTAGES OF FLUID FUELS FOR NUCLEAR POWER STRESSED:- The use of fluid fuel for nuclear power generation has certain advantages which has led to the present considerable emphasis it is receiving at Oak Ridge National Laboratory, Clarence E. Larson, ORNL director recently told the Manufacturing Chemist's Association, at a White Sulphur Springs meeting. He pointed out that liquid fuel will eliminate costly steps in metallurgical preparation of fuel elements; that it reduces radiation damage problems; and that it is easier than solid fuel to handle. These liquid fuels, Larson said, are believed to contain fissionable materials in suspension. Their use, he noted, while possessed of considerable advantages, does introduce problems, such as corrosion, and radiation decomposition of the liquid. Larson observed that fuel needs require that the United States recover uranium and thorium from the low grade ores that occur in this country. Fuels used, he pointed out, are natural uranium, enriched uranium, uranium-233, plutonium or a synthetic mixture of these with each other or with thorium. The form in which these materials may be used includes metal, alloy, oxide, salt, solution or slurry. As to moderators, graphite, water and heavy water are the ones that have found most frequent use, Larson stated. He noted that heavy water is the best moderator, but that it requires isotope separation. As to coolants, Larson stated that possibilities are almost unlimited; they range from air or other gases to liquid metals.

PURCHASE OF SPECIAL PUMPS TO BE MADE:- Bids are to be asked in the near future by the USAEC and Navy Department for "canned" electric motor driven pumps with special leak proof features. The USAEC intends to buy 4 pumps with a capacity of 150 gallons of hot water per minute under pressure of 2200 lbs./sq. in., and 2 pumps with a 30 gallon per minute capacity. The Navy expects to purchase 4 of the 150 gallon per minute size. Performance requirements of both of these agencies will be the same except that the Navy pumps have other features prescribed by military specifications. Developmental pumps of various sizes of this type are now in operation at the Westinghouse-operated Bettis plant, Pittsburgh, and subject to security, etc., may be examined by prospective bidders by making arrangements with the USAEC's Pittsburgh, Pa., area office (Lawton D. Geiger, manager), P.O. Box 1105, Pittsburgh. Details on the bidding may also be obtained from this office, as well as from the contract division, Bureau of Ships, Navy Department, Wash., D.C. These motors consist of a squrrelcage rotor protected from the water by a "can" or jacket of inconel turning within a stator which is likewise protected by "canning". The space between the rotor and the stator is filled with the water being pumped and the bearings can have no lubrication except that afforded by the water.

NEW CONTRACTOR SELECTED FOR LABORATORY OPERATION:- New operator of the USAEC's Raw Materials Development Laboratory, Winchester, Mass., will now be the National Lead Co. The laboratory has been operated by the American Cyanamid Co. under USAEC contract since 1951; the change will take place this July 1st. Work at this laboratory is principally the development of processes for treatment of uranium-bearing ores in the production of uranium concentrates. National Lead, with wide experience in processing metal-bearing ores, operates many plants for the recovery of metals from various types of ore feeds, and has long had a research division doing process development in this field.

ELECTRICAL SUB-CONTRACT AWARDED:- A sub-contract has now been awarded Howard P. Foley Co., Salt Lake City, for a cost-plus fixed-fee job to do all electrical work on the modifications now being made to the chemical processing plant at the National Reactor Testing Station, Idaho Falls, Idaho. The award was made by J. F. Pritchard and Co., the prime contractor on the modification project.

WAGE RISE RECOMMENDED BY FEDERAL NEGOTIATOR:- A six-cents-an-hour wage rise for 8,500 atomic energy workers has now been recommended by the Presidential labor board, headed by Cyrus S. Ching, which was specially created to deal with labor disputes at atomic energy projects. The plants concerned are three at Oak Ridge, and one at Paducah, Ky., operated on a cost-plus-fixed fee basis by Carbide & Carbon Chemicals Co. The dispute, which had threatened a strike, was between Carbide and the A.F.L. (Atomic Trades & Labor Council) and the C.I.O. (United Gas, Coke, and Chemical Workers).

NEW PRODUCTS, PROCESSES & INSTRUMENTS...in the nuclear field...

FROM THE MANUFACTURERS:- Model 2582 "Samson" is a self-contained battery operated ionization type survey instrument. It is for surface measurement of any low level alpha, beta, or gamma contamination: C-14, I-131, S-35, radium, etc. The instrument has a 40 cubic inch ion chamber at the bottom of its case, with a 0.5 mg/sq. cm. rubber hydrochloride window protected by a stainless steel grill. --Model 192 "Ultrascaler" is a new all-purpose scaler for operation with Geiger, scintillation, or proportional counters. This new instrument permits either manual or automatic counting procedures including either predetermined time or count operation or "time count" operation where the count will be stopped at a preset time or preset number of counts depending on which ever occurs first.-- Nuclear Instrument & Chemical Corp., Chicago 10, Ill.

Cesium-137 radiographic sources are now being supplied by this processor at price reductions: a 1 curie source formerly $1175 is now $275, while a 6 curie source formerly $4275 is now $1225. This is made possible, it is said, because the USAEC has cut their raw material prices, and also because this processor will purchase cesium in bulk and encapsulate popular sizes for stock. (Cesium-137 is becoming widely used as a radiographic source material because its lower energy radiation provides radiographs of better contrast when used on thin sections of steel and light metals such as aluminum and magnesium. Other advantages of cesium-137 are a 33-year half-life as compared with 5.3 for cobalt-60.)-- Tracerlab, Inc., Boston 10, Mass.

LABORATORY DEVELOPMENTS:- An electronically-controlled force-reflecting manipulator, considered to be the most advanced general purpose manipulative device thus far developed, has been constructed at Argonne National Laboratory, Lemont, Ill. This new manipulator, used in conjunction with a closed circuit television system, enables for the first time complex laboratory and process manipulations to be performed at a great distance or behind a sealed barrier with a speed and dexterity approaching the unaided hand. The device, which reproduces the seven basic motions which are employed in grasping, lifting, moving and turning objects, consists of two "master" handles which are connected to two "slave" hands by electrical cables. Previously, in manipulators of the "master-slave" type, the master handles were connected to the slave hands by mechanical linkages which did not permit separation of master from slave by distances much greater than twelve feet. This new manipulator is not limited by these connections, and the slave arm may be displaced from the master arm by a distance of several hundred feet. Another feature of this new manipulator is its specially designed servomechanisms which reflect the work loads and resistances back to the operator. (This force reflection, or "sense of feel", is a necessity when performing delicate operations involving sensitive or fragile materials and equipment frequently used in research.)

An inexpensive radiation source (said to cost less than $1000) but with the intensity of an equivalent amount of radium costing 2500 times as much, has now been developed through collaborative efforts of Oak Ridge National Laboratory and University of Notre Dame's radiation project. This new source consists of a battery of 24 brass cylinders strapped around a central cylinder and extending 7-feet below the surface of a concrete floor. In four of the cylinders there is an arrangement of radioactive cobalt slugs on three different levels. An operator may lower a sample in the inner cylinder and expose it for as long as he wishes to radiation intensities which differ by a factor of 100. Milton Burton, director of the radiation project at Notre Dame, said that an industrial organization plans to build such an unfilled source (with the user obtaining the radiocobalt from Oak Ridge) for approximately $950.

NOTES:- A glass which analyzes 75% metallic lead by weight, and which has a radiation shielding value said to be one-half that of metallic lead, is now finding such applications as viewing windows for shielded rooms housing radiation producing sources. This glass, called Hi-D, and developed only recently, is endowed with a high refractive index, permitting extremely wide angle viewing and exceptional clarity. This high density glass is almost as heavy as steel, weighing about 390-lb. per cu. ft., which is 2½-times as heavy as ordinary window glass. Windows up to 2-ft. in thickness have been made from Hi-D glass, which is made by Penberthy Instrument Co., Inc., Seattle, Wash.

NEW BOOKS & OTHER PUBLICATIONS...on nuclear subjects...

Papers on nuclear subjects presented to American Society of Mechanical Engineers, at the semi-annual meeting, Pittsburgh, Pa., last week: (1) Wear & friction properties of materials operated in high temperature water; Westphal & Glatter; Westinghouse Elec. #54-SA-13. (2) Temperature charts for internal heat generation; Heisler; North American #54-SA-44. (3) Test loop for determining heat-transfer coefficients; Mims & Kleber; Westinghouse Elec.;#54-SA-48. (4) Geometrical analogue for two-directional steady state heat conduction; Simmons; Argonne Nat. Lab.; #54-SA-49. (5) Thermal design of nuclear power reactors; Palladino; Westinghouse Elec.; #54-SA-58. (6) Numerical analysis in transient solution of two-dimensional heat-transfer problem; Hellman, Habetler, & Babrov; Knolls Atomic Power Lab.;#54-SA-53. (7) Working stress criteria for nuclear power plants; Langer; Westinghouse Elec.; #54-SA-59. (8) Mechanical design of liquid metal-cooled nuclear reactors; Stahl; Knolls Atomic Power Lab.;#54-SA-60. (9) Performance of turbine-generator units in saturated-steam cycles; Beldecos & Smith;#54-SA-65.--Above pre-prints available at 50¢ each from American Soc. of Mech. Eng., 29 W. 39th St., New York 18, N.Y.

Nuclear Notes for Industry; No. 1. Current USAEC unclassified reports of interest to industry; listed and abstracted.--Tech. Info. Serv., USAEC, Oak Ridge, Tenn.

RAW MATERIALS...radioactive mineral & ore development & production...

UNITED STATES:- The Pittston Co., a holding company with subsidiaries engaged in coal mining, trucking, warehousing, and the distribution of petroleum products, has now transferred to its wholly owned subsidiary, Sierra Ancha Mining Co., Grand Junction Colo., all its uranium properties and claims in Arizona, Colorado, Utah and Wyoming. The properties, which were assembled by Ralph H. Wilpolt, former chief geologist for the USAEC, who joined Pittston a year ago, comprise about 60,000 acres, and include one producer, the Red Bluff mine, Arizona, which is said to be producing some 1,200 tons per month of ore with an estimated value of $30/ton. Pittston said that it would commence drilling at once on the company's Ivory claims, in Utah.....Penn-Texas Corp., through its newly-formed affiliate, Penn-Uranium Corp., has purchased all the outstanding stock of A & B Mining Co., including its leaseholds covering uranium rights on 2,000 acres in the Navajo reservation and other privately owned lands near Flagstaff, Ariz. Oscar L. Chapman, former U.S. Secretary of the Interior, is chairman of Penn-Uranium Corp.

CANADA:- Gunnar Mines, at Lake Athabaska, which has been receiving its scheduled supplies steadily, is now employing some 250 men as accommodations are being increased. With 2,000 tons of supplies for mine, mill and powerhouse already delivered at the mine wharf, some 18,000 tons are to arrive before the close of navigation this Fall.....At Lorado Uranium Mines' Alco property, in the Beaverlodge area, Saskatchewan, shaft sinking operations have recently been started; it is planned that the shaft will be sunk to a depth of 235-feet, to investigate a drill-indicated ore zone. Meanwhile, diamond drilling is continuing on the company's original property, adjoining the Eldorado-Radiore claims.

AT SCIENTIFIC MEETINGS...reports on papers of interest...

The preliminary design of a nuclear reactor system which could generate electrical power, "breed" new fuel for itself, and deliver by-products to waste tanks, all in continuous processes, was described last week by Brookhaven National Laboratory people at the first International Congress on Nuclear Engineering, sponsored by the American Institute of Chemical Engineers, and held at the University of Michigan, Ann Arbor. Some seven papers on this reactor (known as liquid metal fuel reactor: LMFR) were presented by Brookhaven people. Clarke Williams, chairman, Brookhaven's nuclear engineering department, said it was his belief that "a full scale LMFR would offer a possibility of giving the lowest cost electrical energy from fission heat". LMFR would provide the first usage of a liquid metal alloy, in this case uranium-bismuth, as the fuel stream to inter-connect continuous processes, according to Dr. Williams. Uranium-233 would be used. Several advantages which the LMFR design offers as a source of power were listed by Dr. Williams. Of importance is the fact that bismuth is impervious to radiation damage, and that it transfers heat efficiently. As a result, enough fuel could be introduced into the reactor core to provide a chain reaction which would produce large amounts of heat.

ATOMIC PATENT DIGEST...new grants & other news in the nuclear field...

GRANTS: Neutron scintillation counter. Comprises (in part) a thin-walled spherical metallic housing which is opaque to light and charged particles and substantially transparent to neutrons, with a thin layer of hydrogenous material on the inner surface of this housing, whereby neutrons are captured and protons released. A thin layer of fluorescent material is disposed on the inner surface of this hydrogenous material, the fluorescent material being sensitive to proton bombardment to emit light; light detecting means are located in an aperture of this housing. U.S. Pat. No. 2,681,416 issued June 15, 1954; assigned to United States of America (USAEC). (Inventor: B.W. Thompson)

Isolation of flavonoid compounds. An improved method of separating flavonoids from an aqueous solution containing flavonoids and extraneous impurities. Comprises (in part) contacting this aqueous solution with a comminuted cation-exchange resin, separating the resulting flavonoid -depleted solution from the resulting flavonoid-retaining resin, and eluting the flavonoids from the resin with an organic solvent. U.S. Pat. No. 2,681,907 issued June 22nd, 1954; assigned to United States of America (USAEC). (Inventor: S.H. Wender.)

Compounds of the element americium. The process which comprises (in part) treating americium of oxidation state less than six in a solution of perchloric acid of concentration of about 0.3 molar with an excess of a soluble peroxydisulfate, whereby americium is obtained in an oxidation state of six, adding sodium acetate to the solution whereby insoluble sodium americyl acetate is formed, and recovering the precipitated sodium americyl acetate. U.S. Pat. No. 2,681,923 issued June 22nd, 1954; assigned to United States of America (USAEC). (Inventors: L.B. Asprey, R.A. Penneman, and S.E. Stephanou.)

LICENSES AVAILABLE: A new group of 23 patented inventions, developed in the course of nuclear research, and U.S. Government-owned, is now available for royalty-free licensing (non-exclusive). Inquiries should be made to Patent Branch, U.S. Atomic Energy Commission, Wash. 25, D.C. The group comprises: (1) Phase meter for measuring phase difference between electrical signals; no. 2,676,299. (2) Improvement for modifying the counting factor of a scaling circuit; no. 2,676,756. (3) Process for bringing different reaction materials together under the influence of a catalyst; no. 2,676,875. (4) Apparatus and method for separating isotopes of metals; no. 2,677,060. (5) Apparatus for separating metallic materials of very nearly equal atomic mass by producing a relatively high velocity beam of positive ions of the metals or compounds; no. 2,677,061. (6) Instrument for accurately measuring an unknown frequency; no. 2,677,104. (7) Process using carbon tetrachloride and various oxides of uranium for producing uranium tetrachloride; no. 2,677,592. (8) Method of readily and effectively stabilizing a finely divided pyrophoric reduced metal catalyst with respect to atmospheric air and without the occurrence of hot spots; no. 2,677,668. (9) Stepwise stabilization of reduced metal catalysts; no. 2,677,669. (10) Improved fast coincidence circuit; no. 2,677,759. (11) Generating substantial quantities of ions and multi-isotopic metals; no. 2,677,770. (12) Improved ion source in isotope separating apparatus; no. 2,677,771. (13) Neutron thermometer for use in connection with neutronic reactor systems; 2,677,772. (14) Improved dispenser type thermionic cathode which is rugged, simple, and easily disassembled; no. 2,677,778. (15) An effective and simple means for closing and capping cylindrical receptacles or capsules containing fissionable material used in nuclear reactors; no. 2,678,014. (16) Processes for producing activated uranium dioxide; no. 2,678,257. (17) Controlling flow of electrolyte to electrolytic cell; no. 2,678,300. (18) Low friction and low inertia counting device; no. 2,678,773. (19) Apparatus for producing gaseous ions under vacuum in isotope separating apparatus; no. 2,679,597. (20) Jettisonable fastening device; no. 2,679,783. (21) Improved electrically operated remote control manipulator; 2,679,940. (22) Low melting alloy; no. 2,680,071. (23) Protective circuit for cooperation with a parallel-connected ignitron; no. 2,680,212.

Sincerely,

The Staff,
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